KENNEDY DOCUMENTED PROCEDURE
KDP-KSC-P-3007

Damage Assessment and Recovery

/ original signed by /

Director, John F. Kennedy Space Center

CHANGE LOG

DATE	Description	REVISION
06/08/2020	Added Change Log. Added KIAC to the acronym page. Added automatic Table of Contents. Changed formatting and font. Upated hyperlinks.	Rev D-3
05/05/2021	Changed KEMCON to NEMCON in Appendix A. Added NEMCON to acronym page.	Rev D-4

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1. PURPOSE

To ensure implementation of Kennedy NASA Procedural Requirements (KNPR) 8715.2, Comprehensive Emergency Management Plan (CEMP), this Kennedy Documented Procedure (KDP) provides direction on the damage assessment and recovery actions necessary to restore Kennedy Space Center (KSC) to normal safe operating conditions following an emergency situation. This procedure establishes the organizational structure of the Damage Assessment and Recovery Team (DART) and provides guidance for performing assessment of damages to property and infrastructure (e.g., facilities, utilities, systems, and equipment).

2. APPLICABILITY

This KDP applies to all KSC civil servants, contractor organizations, and tenants operating within the boundaries of KSC and in National Aeronautics and Space Administration (NASA) facilities on Cape Canaveral Air Force Station. In addition, this KDP applies to all individuals who have roles and responsibilities in assessing damages following an emergency situation. While hurricanes represent the primary emergency threat to KSC, the DART structure shall also be used to manage recovery efforts for other emergency situations, such as closure or partial closure of KSC, evacuation of or major damage to facilities, loss of utility systems, injury of personnel resulting from a natural disaster or the release of hazardous materials, fire, flooding, or major vehicular accidents. Implementation of this KDP commences when the emergency situation is stabilized and the damage assessment and recovery effort can be safely implemented as determined by the Incident Commander (IC). At that time, incident command and responsibility for incident damage assessment and recovery will transition to the DART Chief.

3. TRAINING

The following Federal Emergency Management Agency (FEMA) Independent Study (IS) Program courses are recommended self-study for all participants in the DART in accordance with KDP-KSC-P-3018, National Incident Management System Component Structure at Kennedy Space Center:

a. IS-100.C, Introduction to the Incident Command System, ICS 100

b. IS-200.C, Basic Incident Command System for Initial Response

c. IS-700.B, An Introduction to the National Incident Management System

4. KSC DAMAGE ASSESSMENT AND RECOVERY TEAM

The KSC DART is composed of the minimum number of essential personnel required to appropriately assess damage, restore essential services and infrastructure, and return KSC to normal safe operating conditions following an emergency situation so that the general workforce can safely return to work. The KSC DART has been organized in accordance with FEMA standards using the National Incident Management System (NIMS) and ICS concepts and principles.

4.1 National Incident Management System And Incident Command System

The NIMS is a system mandated by Homeland Security Presidential Directive 5 that provides a consistent, nationwide approach for Federal, state, local, and tribal governments, as well as the nongovernmental organizations, to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. The NIMS includes a core set of concepts, principles, terminology, and communication and information management so that responders and managers across all agencies, professions, and jurisdictions have a common operating picture for a more efficient and effective response.

The ICS is a subcomponent of the NIMS and is a widely used and understood emergency management tool for the command, control, and coordination of emergency response. The ICS is designed to enable effective and efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. The ICS is normally structured to facilitate activities in five major functional areas: command, operations, planning, logistics, and finance and administration. These functional areas are further categorized into multiple emergency support functions (ESFs), each associated with specific emergency response activities to ensure a consistent command and reporting structure for those activities.

ESFs are groupings of capabilities in an organizational structure that provide the support, resources, program implementation, and services that are most likely to be needed during a hurricane ride-out, hurricane planning, and hurricane response and recovery. They serve as the primary operational-level mechanism that provides support during damage assessment and recovery operations.

The NIMS and ICS are widely used by all levels of government, including federal, state, and local, as well as by many nongovernmental organizations and the private sector, to organize field-level operations for a broad spectrum of incidents.

4.2 Damage Assessment And Recovery Team Organizational Structure

The KSC DART organizational chart can be found in Appendix A. The KSC DART consists of a representative from the NASA Emergency Management Office (NEMO), a DART Chief, 6 ESF Coordinators, and 18 ESF teams that are listed and numbered by discipline, as shown in Figure 1 of this document. The respective KSC organization (or responsible party) is responsible for providing ESF Coordinators, ESF Team Leaders, and other support resources. Each ESF will have one or more DART Task Force/Strike Team(s), each of which will have a Team Leader to perform the necessary field work for assessment and recovery efforts. Each ESF will possess the necessary resources to conduct the recovery efforts for the respective discipline(s) as well as support other ESFs determined by the DART Chief.

> *Note: Under the ICS, Strike Teams are composed of like resources while Task Forces are composed of different types of resources. For the sake of simplicity, all KSC field teams will be referred to as Strike Teams.*

4.3 Damage Assessment And Recovery Team Reporting Relationships

The ESF Coordinators report to the DART Chief and may be responsible for multiple ESF teams. The ESF Coordinators are responsible for the overall management for their particular ESF team(s) throughout the preparedness, response, and recovery phases of incident management. Each ESF team has a Team Leader who reports to a respective ESF Coordinator. In a few cases, the ESF Team Leader and the ESF Coordinator may be the same. Each ESF team may consist of one or more Strike Teams, which are multidiscipline field teams performing the actual hands-on damage assessment and recovery operations. Each ESF team will be responsible for determining its own skills, equipment, and processes required and will possess the necessary resources to conduct the recovery efforts for the respective discipline(s) and support other ESF teams as determined by the DART Chief and ESF Coordinators.

A damage magnitude- and cost-estimating capability called the Damage Assessment Team (DAT) is also part of the DART. The DAT will receive damage inputs from the ESF Coordinators, process the data, and provide the cost estimate reports and assessments to the DART Chief.

ESF Teams	ESF Name	Responsible Organization
ESF 1	Transportation	Spaceport Integration and Services (SI)
ESF 2	Communication	Information Technology and Communications Services (IT)
ESF 3	Public Works and Engineering	SI
ESF 4	Firefighting	SI
ESF 5	Emergency Management	SI
ESF 6	Mass Care, Housing, and Human Services	SI
ESF 7	Logistics Management and Resource Support	SI
ESF 8	Public Health and Medical Services	SI
ESF 9	Urban Search and Rescue	SI
ESF 10	Oil and Hazardous Material Response	SI
ESF 11	Agriculture and Natural Resources	SI

ESF Teams	ESF Name	Responsible Organization
ESF 12	Energy	SI
ESF 13	Public Safety and Security	SI
ESF 14	Long-Term Community Recovery/Mitigation	SI
ESF 15	Public Affairs	Communication and Public Engagement (PX)
ESF 16*	Spaceport Integration	SI
ESF 17*	Propellants/Life Support	SI
ESF 18*	Construction of Facilities Integration (CoF)	Engineering (NE)

Figure 1 – ESF for the DART

*In addition to the FEMA-defined ESF numbers 1 through 15, the additional unique groups, ESFs 16, 17, and 18, are included for KSC use only.

Note: Some ESF Team Leaders may be contractors, as designated by the responsible organization.

4.4 Emergency Support Function Descriptions

ESF 1, Transportation: Provides and supports the transportation requirements of the entire KSC team to include vehicles should ESF team vehicles (from their home organizations) be unavailable or damaged. Collects damage data from all organizations and assesses impacts (technical, cost, and schedule). Provides air surveillance capability via helicopter as required and able given the event.

ESF 2, Communication: Ensures the availability and/or restoration of essential communication services and infrastructure with initial emphasis on the communication needs of first responders and DART members. Following initial response, the focus shifts to availability and/or restoration of communication services across KSC.

ESF 3, Public Works and Engineering: Ensures the availability and/or restoration of essential facility services and infrastructure. Performs initial assessment and safing of power and utility services, along with facility structural and road and bridge inspections. Following initial response, the focus shifts to ensuring availability and/or restoration of facility services across KSC.

ESF 4, Firefighting: Provides any structural firefighting and aircraft rescue firefighting capability required.

ESF 5, Emergency Management: Coordinates incident management and response efforts for an incident. Issues mission assignments, manages resource and human capital, and provides incident action planning and financial management as required.

ESF 6, Mass Care, Housing, and Human Services: Provides the planning and capability for mass care, emergency assistance, disaster housing, and human services that may be needed.

ESF 7, Logistics Management and Resource Support: Provides logistics services related to required materials, and other hurricane supplies (rope, axes, cots, water, etc.). Provides procurement services for offsite support, as required.

ESF 8, Public Health and Medical Services: Provides the services needed to identify and resolve public/occupational health and medical needs of victims. Provides services to victims of outbreaks or other incidents, including manmade or natural disasters as well as medical emergencies.

ESF 9, Urban Search and Rescue: Provides lifesaving assistance and search and rescue operations as required given the event.

ESF 10, Oil and Hazardous Material Response: Responds to oil and hazardous materials (chemical, biological, radiological, etc.) incidents to provide short- and long-term environmental cleanup.

ESF 11, Agriculture and Natural Resources: In coordination with ESF 8, delivers an effective synergistic response that considers human, animal, and environmental health that may have been compromised during the disaster.

ESF 12, Energy: Ensures the operating condition of base operations fueling capabilities including mobile tankers.

ESF 13, Public Safety and Security: Provides facility and resource security, security planning and technical resource assistance, and public safety and security support for access, traffic, and crowd control.

ESF 14, Long-Term Community Recovery/Mitigation: Provides leadership as the DART Chief to the ESF Coordinators and the ESF teams to accomplish the required recovery tasks. As the DART Chief, determines recovery priorities and provides status updates directly to the Emergency Decision Team and the Center Director (CD).

ESF 15, Public Affairs: Serves as a conduit for the flow of information as to how KSC is preparing for a hurricane or tropical storm, is riding out the storm, or is dealing with the aftermath of the storm. Staffs and serves as a spokesperson for the Emergency Operations Center (EOC) and associated activities, as determined necessary.

ESF 16, Spaceport Integration and Services: Provides coordination and integration of the preparation, securing, damage assessment, and recovery operations of all flight hardware, processing equipment, and high-value ground support equipment for NASA programs and commercial partners operating at KSC.

ESF 17, Propellants/Life Support: Provides for the storage, use, and transportation of propellants as well as providing, issuing, and maintaining life support equipment at KSC. Inspects related facilities and systems and equipment and assesses damage. Assesses the high-pressure nitrogen and helium pipeline systems to ensure purges and/or minimum pressures are available to customers. Works with all propellants customers to support purge requirements or assist in damage assessment or restoration of system capability. Provides life support equipment and support to customers requiring safing or cleanup of hazardous or toxic systems.

ESF 18, Construction of Facilities Integration: Provides the design engineering and management of projects on KSC and supports the DART in determining the stability of structures and safety of construction after a storm or other emergency affecting property. Reports damages at active CoF projects to the DAT Leader and provides estimates for associated repair costs.

5. ANNUAL KSC DAMAGE ASSESSMENT AND RECOVERY TEAM ACTIONS

Prior to the beginning of hurricane season, the DART Chief shall direct each organization to identify DART members (by name). The NEMO, in coordination with the DART Chief, shall conduct a meeting with the ESFs annually (in the April/May timeframe before hurricane season starts) to tabletop review this KDP and review other lower-level processes and procedures. For situational awareness purposes, the DART will review operational schedules and manifests to forecast any flight hardware or other high-value or high-visibility assets that may be present at KSC during hurricane season. ESF 2, Communication, shall lead the development of the DART communications plan, based on KDP-KSC-P-3002, Command, Control and Communications. The DART shall address any necessary procedural changes prior to the start of hurricane season. The NASA and contractor members shall update their respective organizational emergency preparedness documentation accordingly.

6. DAMAGE ASSESSMENT AND RECOVERY TEAM IMPLEMENTATION

This section describes the roles and responsibilities of the key players and the processes used in DART operations. The damage assessment and recovery processes are not separate, distinct, serial activities; rather, these efforts happen in parallel. The sequencing and coordination of all these activities is managed by the DART Chief.

6.1 Roles and Responsibilities

6.1.1 The NEMO shall:

a. Designate a qualified individual who is capable of leading the DART efforts.

b. Develop and release announcements to the KSC workforce during DART activities.

c. Assemble DART personnel, once the Ride-Out Team (ROT) or first responders (depending on the nature of the incident) complete their work.

d. Prioritize access roads to be cleared and opened and determine their primary mission capability.

e. Continue to serve as the IC until the DART is assembled, a safety briefing has been conducted, and the DART Chief can assume command.

f. Continue to manage the EOC in support of the DART Chief to maintain effective internal and external communications to KSC.

g. Conduct a teleconference during the incident with the DART Chief and all the ESFs to coordinate DART preparations and establish agenda items for reporting to senior management as the recovery is initiated.

6.1.2 The DART Chief shall:

a. Designate two qualified individuals to act as backup DART Chiefs.

b. Assume the role of IC when relinquished by the NEMO.

c. Develop a prioritized list of recovery actions.

d. Develop a prioritized list of essential facilities and infrastructure to be returned to normal operations.

e. Direct the applicable ESFs to verify and restore facility power and environmental systems supporting flight hardware in coordination with ESF 16.

f. Provide periodic reporting to the CD and KSC senior management.

g. Make necessary adjustments to plans and facilitate timely resolution of conflicting priorities.

h. Work with KSC senior management to acquire the necessary resources to restore safe operational capabilities.

i. Recommend to the CD that an “All Clear” announcement be made when the Center has been determined to be safe.

6.1.3 The ESF Coordinators shall:

a. Serve as the focal points for all coordination, priorities, resources management, deployment, and response of their assigned ESF(s).

b. Lead, manage, coordinate, and direct their assigned ESF Team Leaders.

c. Maintain frequent communication with the DART Chief.

d. Assist the DART Chief in developing overall priorities and in resolving conflicting requirements.

e. Assist the DART Chief in developing periodic status reports to the NEMO, the CD, and other senior stakeholders.

6.1.4 ESF Team Leaders shall:

a. Serve as the focal points for execution of their assigned ESF responsibilities.

b. Lead, manage, coordinate, and direct their assigned ESF Strike Team Leaders.

c. Maintain frequent communication with the respective ESF Coordinator.

6.1.5 ESF Strike Team Leaders shall:

a. Lead the interdisciplinary team to perform the field work for damage assessment and recovery efforts.

b. Provide technical leadership to the team and technical advice to the ESF Team Leader.

c. Develop reports and recommend recovery and restoration.

d. Maintain frequent communication with the respective ESF Team Leader.

6.2 Damage Assessment Process

In the case of a closure of KSC due to a weather event that necessitates a ROT, the NEMO shall direct the ROT to perform the initial assessment of KSC infrastructure. In other emergency situations, the first responders will provide the initial damage assessment. In all emergency situations that warrant DART efforts, the NEMO will assemble the DART ESFs and ESF Strike Team Leaders in the KSC Auditorium and Training Building, M7-0351, (or other designated location) as soon as practical. Upon arrival at KSC, the DART members shall report to the respective ESF Strike Team Leader. The leaders shall record all names, responsibilities, and DART designations assigned in accordance with the organization chart as shown in Appendix A. The NEMO and EOC staff will conduct a safety briefing and communicate the known damage as observed by the ROT initial assessments (e.g., any roadway obstructions, highly visible facility damage, downed power transmission lines, potential hazardous material releases, and other concerns).

Following the safety briefing, the incident will transition from a response action to assessment and recovery. At this time the DART Chief will take charge of the assessment and recovery actions. The meeting will continue with the DART Chief and ESFs assessing ongoing actions, developing the next immediate or near-term actions, and establishing the overall tactical forward plan for the damage assessment and recovery activities. The priorities will be primarily based on the criticality and purpose of the facilities, as well as the severity of the damage, as provided by the ROT's initial assessment. Each ESF will collaborate with the respective ESF Strike Team Leaders to determine the best approach to manage and deploy the assigned Strike Team personnel. The DART Strike Teams will perform the hands-on assessments in the field. Real-time requirements will be communicated back to the EOC for response by the appropriate entity.

As a safety measure, each individual ESF Strike Team will maintain communication with the respective ESF, including notification upon entering and leaving facilities and other work areas. Each Strike Team shall report to the respective ESF to communicate findings and receive further guidance or direction. The ESF will determine reporting times and frequency.

The DART Chief will maintain frequent communication with the ESFs and may conduct formal status meetings multiple times each day. The DART Chief will provide periodic status updates to the Emergency Decision Team; this team includes the KSC CD, KSC senior management, and representation from KSC contractor senior management. During these status reviews, the DART Chief and NEMO will provide recommendations on criteria for reopening KSC (or damaged areas within KSC) and the appropriate time to announce the "All Clear" for the KSC workforce to return to work. The CD will make the final decision on when to reopen KSC for normal business. The NEMO will provide the appropriate announcements to the KSC workforce. When the Center is in an acceptable condition to return to normal business, the DART Chief will perform an organized transition of open work to the responsible KSC line organizations and then release the DART.

For clarity, the emergency response to 911 calls and associated processes remain unchanged during the DART process. For these localized emergencies, Fire or Security (depending on the nature of a localized emergency situation) shall be the IC for the particular emergency scenes while the DART Chief continues to manage the overall DART process. The DART Chief will use the EOC (ESF 5) to monitor the status of the localized emergency situation.

7. DAMAGE ASSESSMENT AND REPORTING

Each ESF will report damages to the DAT. The DAT is composed of engineering disciplines and other specialists who possess the cost-estimating skills necessary to estimate monetary impacts due to damage in the respective areas. The DAT shall develop cost estimates for, and classify, all damages (by facility or asset) in one of the following categories:

a. Minor Damage: Damage to facilities, operational areas, equipment, or the environment where the cost to repair does not exceed the local authority project funding thresholds (i.e., less than $1 million per facility or asset). The damage may prevent the use of a facility or operational area for a temporary period of time, but the asset(s) is likely repairable.

b. Major Damage: Damage to facilities, areas, equipment, or the environment,where the cost to repair or replace requires CoF-level funding (i.e., greater than $1 million per facility or asset). The damage may prevent the use of a facility or operational area for an extended period of time, and the asset(s) may or may not be repairable.

c. Catastrophic Damage: Damage has destroyed facilities, areas, equipment, or the environment and cannot be repaired. The replacement costs require CoF-level funding (i.e., greater than $1 million per facility or asset). The damage permanently prevents the use of a facility or operational area.

The DAT shall use the Disaster Assessment Recovery System (DARS) to collect data and provide the rough order of magnitude estimates of damages. Members of the DAT operate the DARS software program. The ESF Coordinators shall integrate all cost estimates into a summary damage assessment, which will be a standard agenda item for the formal status briefings to the DART Chief. All of the cost estimates will be integrated into a Center-level damage assessment and provided as a standard agenda item in the DART Chief's status briefings to the Emergency Decision Team. The damage assessments at the ESF and at the Center level will be continually updated as new information becomes available.

8. LESSONS LEARNED

Within 24 hours following recovery from an emergency, accident, or incident, the NEMO shall initiate a lessons learned activity with emphasis on the identification of corrective actions that may improve KSC's future responses. The NEMO shall:

a. Organize a meeting with all the key participants who responded to the incident.

b. Develop an event description that includes all related information, including photographs and video, if available.

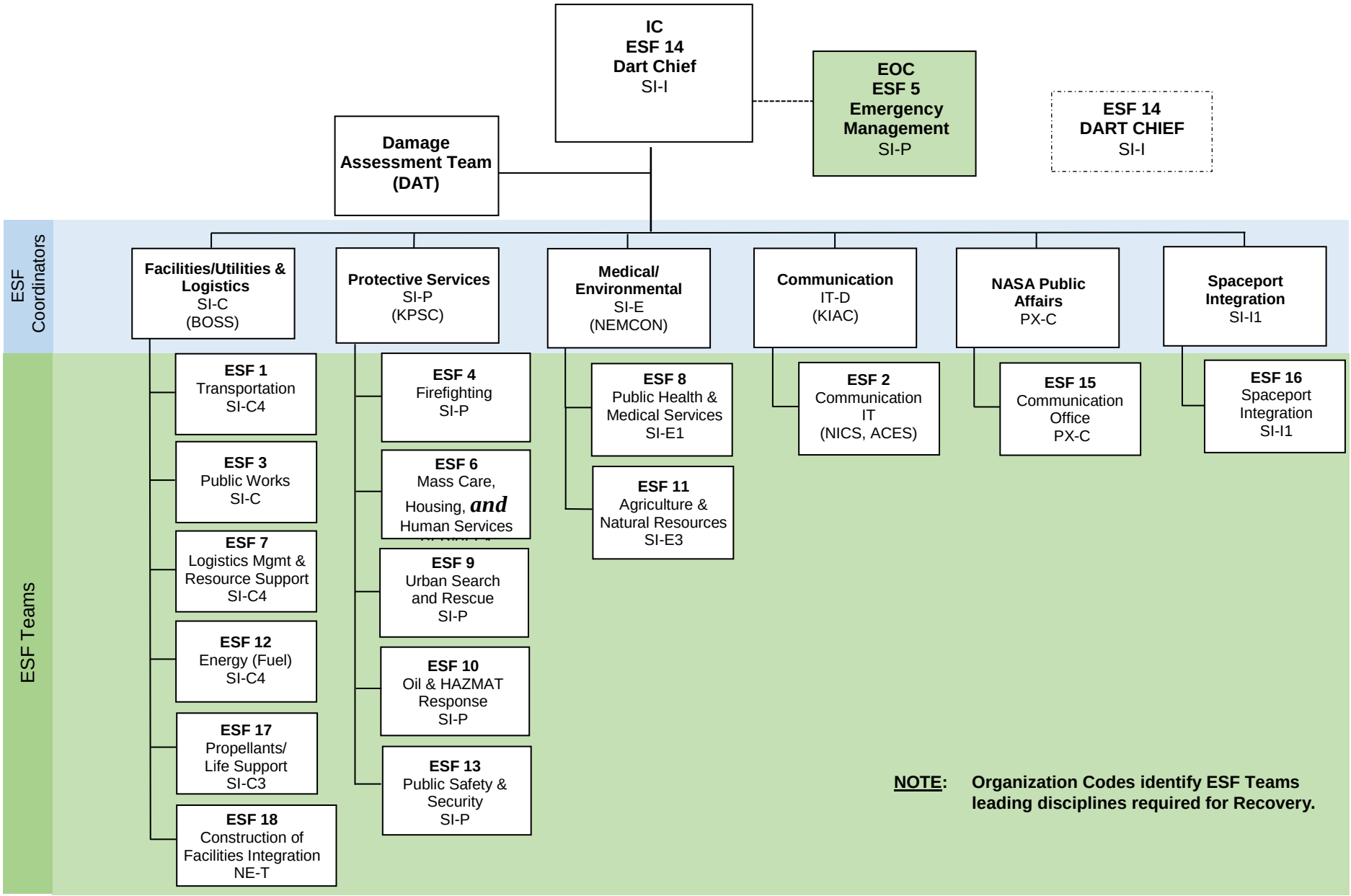
c. Collect recommendations from participants. A core set of questions, identified in Appendix C, Lessons Learned Checklist, may be beneficial for guiding the discussions and developing recommendations.

d. Prepare an After-Action Report, identifying all recommendations for improvement. The report shall include a summary of actions to be taken and a corrective action assignment matrix.

e. Deliver a summary briefing, based on the After-Action Report, to the Director of SI and other stakeholders.

f. As appropriate, upload information in the Lessons Learned Information System as described in KDP-KSC-P-2393, KSC Lessons Learned System.

APPENDIX A: DAMAGE ASSESSMENT AND RECOVERY TEAM ORGANIZATIONAL CHART



APPENDIX B: ACRONYMS AND ABBREVIATIONS

ACES	Agency Consolidated End-User Services
BOSS	Base Operations and Spaceport Services
CD	Center Director
CoF	Construction of Facilities
DARS	Disaster Assessment Recovery System
DART	Damage Assessment and Recovery Team
DAT	Damage Assessment Team
EOC	Emergency Operations Center
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
IC	Incident Commander
ICS	Incident Command System
IS	Independent Study
IT	Information Technology and Communications Services
KDP	Kennedy Documented Procedure
KIAC	Kennedy Infrastructure, Applications and Communication
KSC	Kennedy Space Center
NASA	National Aeronautics and Space Administration
NE	Engineering
NEMCON	NASA Environmental and Medical Contract
NEMO	NASA Emergency Management Office
NICS	NASA Integrated Communications Services
NIMS	National Incident Management System
PX	Communication and Public Engagement
ROT	Ride-Out Team
SI	Spaceport Integration and Services

APPENDIX C: LESSONS LEARNED/AFTER-ACTION REPORT CHECKLIST

Direction, Control, Coordination:	**Alerting and Warning:**
1. Were strategies and tactics effective?	1. Were there major hardware failures?
2. Was the command organization effective?	2. Did KSC receive warnings?
3. Were control operations effective?	3. Was warning information followed?
4. Were resources adequate?	4. Were there preventable injuries or fatalities?
5. Were mutual aid procedures adequate?	
6. Was outside coordination adequate?	**Evacuation:**
	1. Was evacuation conducted on time?
Public Information:	2. Were transportation resources adequate?
1. Were there complaints from the public?	3. Was there a problem with canceling tours?
2. Were there complaints from the media?	4. Was there traffic gridlock?
3. Were there excessive rumors and misinformation?	
4. Were emergency bulletins heeded?	**Medical and Mass Casualty:**
5. Was KSC's response appropriate?	1. Was patient triage adequate?
6. Did KSC and public receive sufficient information?	2. Was field treatment appropriate?
	3. Was a temporary morgue established?
Fire Suppression:	4. Was disposition of casualties adequate?
1. Were fires contained and controlled?	5. Were there sufficient resources?
2. Were firefighting resources adequate?	6. Was management of fatalities provided?
3. Were search and rescue efforts effective?	7. Was casualty list prepared and released?
4. Were hazardous material leaks controlled?	8. Was mutual aid requested?
5. Was mutual aid requested?	
	Transportation:
Law Enforcement and Security:	1. Were transportation resources adequate?
1. Was perimeter and traffic control adequate?	2. Were maintenance and repairs adequate?
2. Was control of criminal activity adequate?	
3. Were there any security problems?	**Human Resources:**
4. Was mutual aid requested?	1. Was enough food and shelter available?
	2. Was counseling adequate?
Communications:	3. Were funds available?
1. Were there major hardware failures?	4. Were relief efforts effective?
2. Were emergency notifications made?	
3. Were field communications adequate?	**Maintenance and Operations:**
4. Was there adequate outside assistance?	1. Were facilities protected?
	2. Was support in assessing damage adequate?
Administration:	
1. Were purchasing procedures adequate?	**Utilities:**
2. Was legal advice timely and adequate?	1. Was service returned in a reasonable time?
3. Were overall emergency costs documented?	2. Were resources adequate?

Hazard Identification:	**Recovery:**
1. Was the analysis of the hazard accurate?	1. Was adequate funding available?
2. Were toxic models produced and was timely dissemination and notification performed?	2. Did recovery include provisions to prevent future emergencies?
	3. Were recovery actions timely and adequate?
	4. Were timely weather warnings disseminated?

APPENDIX D: REFERENCES

Homeland Security Presidential Directive 5

Kennedy Space KNPR 8715.2, Comprehensive Emergency Management Plan (CEMP)

KDP-KSC-P-3018, National Incident Management System Component Structure at Kennedy Space Center

IS-100.C, Introduction to Incident Command System

IS-200.C, Basic Incident Command System for Initial Response

IS-700.B, An Introduction to the National Incident Management

KDP-KSC-P-3002, Command, Control, and Communications

KDP-KSC-P-2393, KSC Lessons Learned System